

(12) **UK Patent Application** (19) **GB** (11) **2 215 094 A** (13)  
 (43) Date of A publication 13.09.1989

(21) Application No 8802572.1

(22) Date of filing 05.02.1988

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(51) INT CL<sup>4</sup>  
**G06F 15/21**

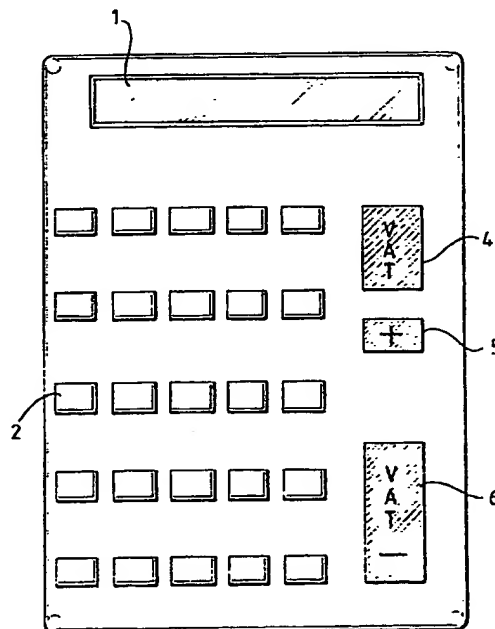
(52) UK CL (Edition J)  
**G4A AUX**

(56) Documents cited  
**GB 1426563 A** **US 4009379 A** **US 3955074 A**

(58) Field of search  
 UK CL (Edition J) **G4A ACX ADT AKS AUX, G4T**  
**TBA**  
 INT CL<sup>4</sup> **G06F**

(54) Calculator

(57) The calculator has in addition to the normal basic calculation functions of addition, subtraction, multiplication and division, facilities to produce, as pre-programmed operations, a preset percentage ( $p \times n/100$ ) of a number  $n$  in the register, the sum  $n(1 + p/100)$  of that number  $n$  and the preset percentage thereof, and also to derive from an input or calculated number  $m$  in register the number  $m(1 + p/100)^{-1}$  which would, when enhanced by the preset percentage, give rise to the input or calculated number  $m$ . These are the calculations required to calculate value added tax (VAT) at  $p\%$  on a net amount  $n$  and the net amount, less value added tax at  $p\%$ , included in a gross amount  $m$ . Three distinctive keys 4, 5 & 6 are provided for performing these calculations. Key 4 is depressed to calculate the VAT on a net price  $n$  in the register. Key 5 is then depressed to calculate the gross price  $m$ . Key 6 is depressed to calculate the net price  $n$  from a gross price  $m$  entered in the register.

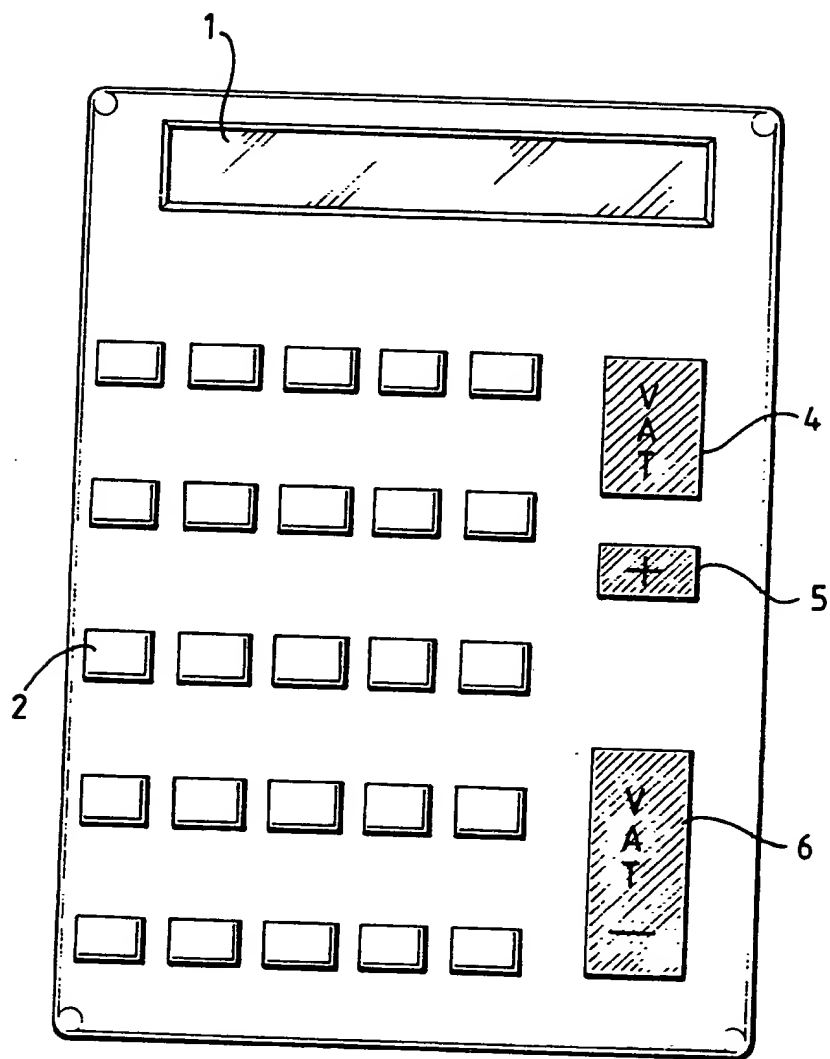


At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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"Calculator"

This invention relates to calculators.

Pocket or desk calculators are well known and normally include keys performing the functions of addition, subtraction, multiplication and division. Frequently, there is also included a key for deriving a percentage, at a rate keyed in, from the number in the register. Another common specific function is to derive the square root of the number in the register. In addition, more complex, and expensive, calculators are known for deriving or performing other results or functions. Such calculators may also include programmable function keys so that the user may adapt the calculator to his own particular requirements at any time. These so-called scientific calculators have their uses in educational and scientific establishments, but are little used by traders or the general public. The very complexity of the facilities available has an intimidating effect on normal users, and this may lead to errors when even comparatively simple calculations are carried out.

It is an object of the invention to provide a calculator which enables a particularly common class of calculation to be carried out on an input or calculated number.

In accordance with the present invention, there is provided a calculator having in addition to the normal basic calculation functions of addition, subtraction, multiplication and division, facilities to

produce, as preprogrammed operations, a preset percentage  $(p \times n/100)$  of a number  $(n)$  in the register, the sum  $n(1 + p/100)$  of that number  $(n)$  and the preset percentage thereof, and also to derive from an input or calculated number  $(m)$  in register the number  $m(1 + p/100)^{-1}$  which would, when enhanced by the preset percentage  $p$  give rise to the input or calculated number  $m$ . It will be appreciated that these are the calculations required to calculate value added tax (VAT) at  $p\%$  on a net amount  $n$ , and the net amount, less value added tax at  $p\%$ , included in a gross amount  $m$ .

At present, the VAT rate in the U.K. is 15% and the preset value of  $p$  is currently preferably set at that level. In other countries, and at other times, different rates prevail and the calculator would be preset accordingly.

If the calculator were inexpensive enough to be regarded as disposable, there would be no means for changing the preset value of  $p$ , and the calculator would need to be replaced on a change in VAT rate. However, it is within the scope of the present invention to provide a user-accessible program change arrangement, or a replaceable circuit component, to enable the value of  $p$  to be changed to cope with changes in the standard rate of VAT.

In view of the use of decimal currency systems, it is preferred that the calculation of VAT and the net price from a gross price be appropriately rounded

to 2 places of decimals to arrive at a directly usable result.

The invention will further be described with reference to the accompanying drawings of a preferred form of calculator in accordance with the invention, of which the sole figure shows the keyboard display of a calculator forming one embodiment of the invention.

The drawing shows the front face of the calculator having the usual display panel 1 and the usual function and numeric keys 2. No description of this conventional part of the calculator is necessary except to note that it includes numeric keys 0 to 9, function keys for multiplication, division, addition and subtraction and also additional keys for use of a memory and percentage function as well as on/off and correction keys as is conventional.

In accordance with the present invention, there is provided a set of additional keys 4, 5 and 6, which are highlighted by being shown cross-hatched.

The key 4, marked with the legend VAT, actuates the calculator to calculate and display the preset percentage ( $p \times n/100$ ),  $p$  being currently 15% in the U.K., of the number  $n$  in register and to display this on the display 1. For ease of use this key is given a distinctive colour, such as red.

On depression of the key 5, marked "+", this percentage is then added to the original number in register so as to display the gross price  $n(1 + p/100)$ ,

inclusive of VAT. This calculation may be arrived at by addition of the 15% calculated upon depression of key 4 to the number in register, or by a fresh calculation of 115%. For ease of identification by a user, this key may also be a distinctive colour, such as orange.

The key 6, marked with the legend "VAT -", performs a calculation of treating the number in register as the gross price, and so divides by 1.15 (at present rates) to display the net price in the display 1. Again, the key 6 may be of a distinctive colour, such as blue.

In the cheaper versions, the figure of 15% for the preset percentage change will be permanently in the hardware, but in more expensive calculators offering a user programming function, the user may be able to change the percentage. As an alternative to a software change, a replaceable circuit board may be provided to enable the calculator to cope with different rates.

In use, it will be apparent that where the price is quoted net of VAT, then the VAT may be readily calculated and added in to arrive at the gross price, by using the keys 4 and 5 respectively. In the alternative, where a gross price is quoted, and VAT element is required to be subtracted, the key 6 enables the net price to be arrived at. This is particularly helpful in cases where refund of VAT is being claimed.

A calculator of this form finds particular application in trade establishments where VAT has to be calculated, and is also usable by the customer, either as

a member of the public or as a trade customer, desiring to know the net price.

It is appreciated that the use of a normal percentage button or a comparatively simple calculation enables these amounts to be calculated, but the single key operation enables keying errors to be eliminated, and also enables the calculator to be used by less numerate personnel.

Various modifications may be made within the scope of the invention.

Claims

1. A calculator having in addition to the normal basic calculation functions of addition, subtraction, multiplication and division, facilities to produce, as  
5 pre-programmed operations, a preset percentage ( $p \times n/100$ ) of a number  $n$  in the register, the sum  $n(1 + p/100)$  of that number  $n$  and the preset percentage thereof, and also to derive from an input or calculated number  $m$  in register the number  $m(1 + p/100)^{-1}$  which  
10 would, when enhanced by the preset percentage, give rise to the input or calculated number  $m$ .
2. A calculator as claimed in Claim 1, wherein the preset value of  $p$  is set to the VAT rate applicable in the U.K. at a given moment of time.
- 15 3. A calculator as claimed in Claim 1 or Claim 2, wherein no means are provided for changing the preset value of  $p$ .
4. A calculator as claimed in Claim 1 or Claim 2, wherein means are provided for changing the preset value  
20 of  $p$ .
5. A calculator as claimed in any one of Claims 1 to 4, wherein a first key is provided for actuating the calculator to calculate and display the preset percentage of a number  $n$  in the register.
- 25 6. A calculator as claimed in Claim 5, wherein a second key is provided for actuating the calculator to calculate and display the sum of the number  $n$  and the preset percentage thereof.



7. A calculator as claimed in Claim 6, wherein a third key is provided for actuating the calculator to derive from an input or calculated number  $m$  in the register the number which would, when enhanced by the preset percentage, give rise to the input or calculated number  $m$ .

8. A calculator as claimed in Claim 7, wherein the colours of the first, second and third keys are different from one another and from other keys of the calculator.

9. A calculator substantially as hereinbefore described with reference to the accompanying drawing.

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